

(12) UK Patent Application (19) GB (11) 2 061 775 A

(21) Application No 8033146

(22) Date of filing
14 Oct 1980

(30) Priority data

(31) 7909084

(32) 1 Nov 1979

(33) Sweden (SE)

(43) Application published
20 May 1981

(51) INT CL³ H02K 5/15
15/14

(52) Domestic classification
B3A 44
H2A BQ

(56) Documents cited

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(58) Field of search

B3A

H2A

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(54) **An electric motor and a method of manufacturing an electric motor**

(57) An electric motor comprises a stator (10) and an end cap (16). The stator has laminations (11) which form a circular outer stator surface having at least two diametrically opposed grooves (14) which extend axially. The grooves end at a distance from the respective stator end so that two radially directed abutments (15) are formed. The cap (16) is slidably fitted over the stator end to a position in which the cap extends a distance over the grooves (14). In this relative position of stator and cap a tool is applied to depress metal from the cap into the grooves and against the abutments. To determine the distance to which the cap is slid on to the stator the cap has inwardly

bent lugs (17) which abut the adjacent stator end surface.

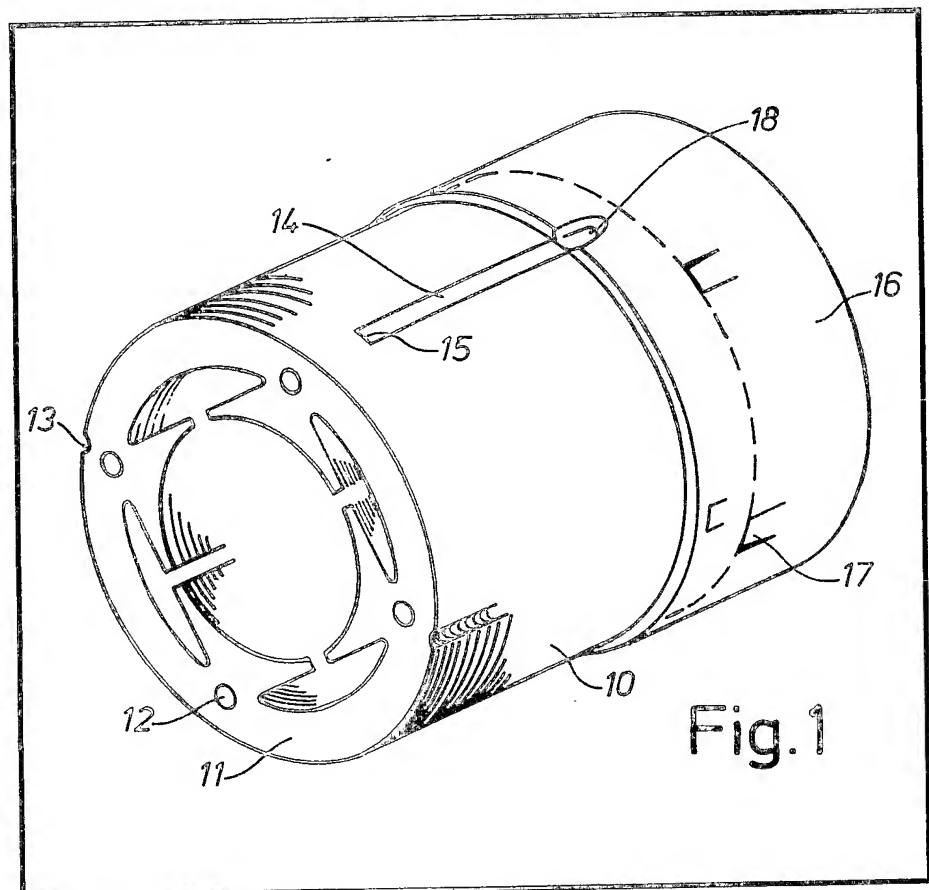
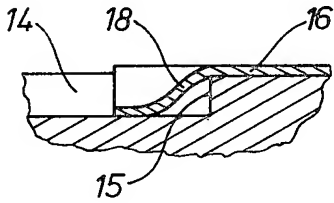
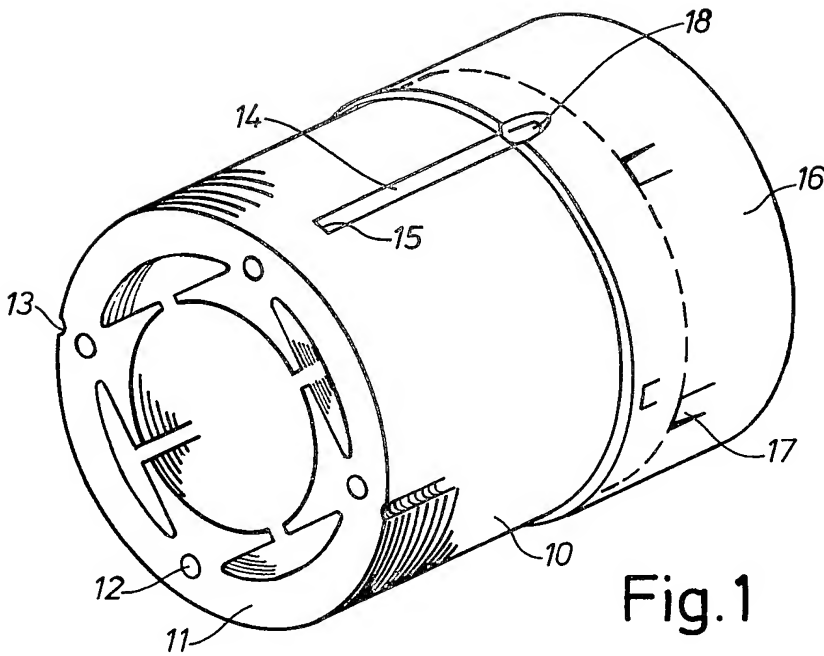


Fig. 1



SPECIFICATION

An electric motor and a method of manufacturing an electric motor

This invention relates to an electric motor which comprises a stator having a circular outer contour and at least one end cap slidably fitted over and fixed to the outer contour of the stator. The invention also relates to a method of manufacturing such a motor.

The common way of joining an end cap to a stator is to make portions of the end cap abut an end surface of the stator and to secure the stator to the end cap by axially extending screws with nuts.

An object of the invention is to provide a motor and a method of manufacturing it in which neither screws nor nuts are required for holding stator and end caps together. Another object is to reduce the number of working steps for assembling stator and end caps and preferably to eliminate them.

According to this invention an electric motor comprises a stator having a substantially circular outer surface and at least one end cap slidably fitted over and fixed to the outer surface which has at least two axially extending grooves which, at a distance from the stator ends, form abutments, the or each cap having a number of grooves, and each portion being depressed into the relevant groove against the abutment to secure the cap or caps against axial and peripheral movement on the stator.

Also according to this invention a method of manufacturing an electric motor comprises:— providing in the outer surface of the stator at least two axially extending grooves which, at a distance from the stator ends, form abutments; sliding an end cap over one stator end past the abutments; and depressing portions of the end cap into the relevant grooves against the abutments so as to fix the end cap to the stator.

An embodiment of the invention will now be described by way of example, with reference to the drawing, in which:—

Figure 1 is a perspective view of a motor;

and *Figure 2* is a detail cross section.

Referring to the drawing, a stator 10 having a circular outer contour is formed by a plurality of stator laminations 11 secured to one another by through rivets 12. Each lamination has two diametrically opposed slots 13 which are aligned so as to form grooves 14. Those laminations which are situated more than approximately 10 mm from the respective stator end are turned through 90° relative to the other laminations, as seen in Fig. 1. In this way radially extending edges 15 (see also Fig. 2) are formed in the grooves 14 for securing an end cap 16.

To assemble an end cap 16 and the stator

10 the cap is slidably fitted over the stator end and over grooves 14 a distance which can be determined in a simple way by guide members. In Fig. 1 the latter are in the form of lugs 17 punched from the cap, which is of sheet metal, and bent inwardly. The lugs are equally spaced about the periphery of the cap and abut the stator end surface when the cap is mounted on the stator. When the cap is in this position a tool is applied which depresses portions 18 of the cap into the grooves 14 and against the edges 15, as shown. These depressions are made simultaneously into all the grooves 14.

As will be understood, the necessary preparation of the stator laminations will have already been made during their manufacture, and no subsequent adjustment of the stator structure is required for assembling the motor. Since metal from the cap is depressed in one operation into the relevant grooves and against the radial edges to form a joint, no preparatory treatment of the cap is necessary either.

CLAIMS

1. An electric motor comprising a stator having a substantially circular outer surface and at least one end cap slidably fitted over and fixed to the outer surface which has at least two axially extending grooves which, at a distance from the stator ends, form abutments, the or each cap having a number of portions corresponding to the number of grooves, and each portion being depressed into the relevant groove against the abutment to secure the cap or caps against axial and peripheral movement on the stator.

2. A motor according to claim 1, wherein the stator comprises a plurality of laminations each with at least two diametrically opposed slots which form the grooves, the laminations adjacent each stator end being turned through a given angle to form radially directed edges which constitute the abutments.

3. A motor according to claim 2, wherein the said laminations are turned through an angle of 90°.

4. A motor according to claim 2 or claim 3, wherein four grooves are arranged in pairs, the pairs of grooves forming an angle relative to one another which is less than 90°.

5. A motor according to any preceding claim, wherein the or each end cap has projections abutting the adjacent stator end.

6. A motor according to claim 5, wherein the projections are inwardly bent lugs punched from the cap.

7. A method of manufacturing an electric motor comprising a stator having a substantially circular outer surface and at least one end cap slidably fitted over and fixed to the outer surface, the method comprising:— providing in the outer surface of the stator at least two axially extending grooves which,

at a distance from the stator ends, form abutments;

sliding an end cap over one stator end past the abutments; and

- 5 depressing portions of the end cap into the relevant grooves against the abutments so as to fix the end cap to the stator.

8. A method according to claim 7, wherein the stator comprises a plurality of
10 stator laminations, the method further comprising:—

punching from the stator laminations two diametrically opposed slots;

- 15 arranging the laminations so that the slots coincide to form two diametrically opposed grooves;

- at each stator end turning laminations adjacent each end through a given angle to form abutments in the form of radially directed
20 edges in the grooves;

sliding an end cap over one stator end past the radial edges; and

depressing portions of the end cap into the relevant grooves against the radial edges.

- 25 9. A method according to claim 8, comprising turning the said laminations adjacent each end through 90° relative to the other laminations.

10. A method according to any of claims
30 7 to 9, comprising punching out lugs in an end cap and bending the lugs inwardly to abut the adjacent stator end.

11. An electric motor constructed and arranged substantially as herein described and
35 shown in the drawing.

12. A method of making an electric motor substantially as herein described, with reference to the drawing.

PUB-NO: GB002061775A
DOCUMENT-IDENTIFIER: GB 2061775 A
TITLE: An electric motor and a
method of manufacturing an
electric motor
PUBN-DATE: May 20, 1981

ASSIGNEE-INFORMATION:

NAME	COUNTRY
ELECTROLUX AB	N/A

APPL-NO: GB08033146
APPL-DATE: October 14, 1980

PRIORITY-DATA: SE07909084A (November 1, 1979)

INT-CL (IPC): H02K005/15 , H02K015/14

EUR-CL (EPC): H02K001/18 , H02K005/15

US-CL-CURRENT: 310/89 , 310/258

ABSTRACT:

CHG DATE=19990617 STATUS=O> An electric motor comprises a stator (10) and an end cap (16). The stator has laminations (11) which form a circular outer stator surface having at least two diametrically opposed grooves (14) which extend axially. The grooves end at a distance from the respective stator end so that two radially

directed abutments (15) are formed. The cap (16) is slidably fitted over the stator end to a position in which the cap extends a distance over the grooves (14). In this relative position of stator and cap a tool is applied to depress metal from the cap into the grooves and against the abutments. To determine the distance to which the cap is slid on to the stator the cap has inwardly bent lugs (17) which abut the adjacent stator end surface. □